the TOBACCO BUDWORM

and its control

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THE TOBACCO BUDWORM AND ITS CONTROL

Prepared by the Division of Truck Crop and Garden Insect Investigations, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration.[1]

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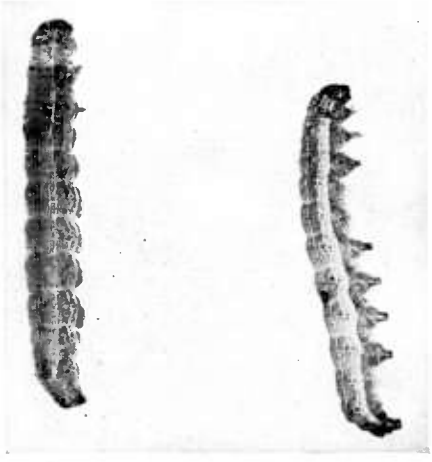

FIGURE 1.—Tobacco budworms, nearly full grown. Enlarged.

FIGURE 2.—Pupa of the tobacco budworm. Slightly enlarged.

IN THE SOUTH the tobacco budworm[2] is one of the most destructive pests of tobacco plants in the field. All types of tobacco must be protected from the pest by the use of insecticides. It is especially important to prevent injury to leaves of cigar-wrapper tobacco.

Fortunately, very simple and efficient measures for the control of this pest are at the command of the tobacco grower.

DESCRIPTION AND HABITS

The tobacco budworm passes through four stages in the course of its development—the egg, the larva, the pupa, and the adult. The eggs are small, whitish, nearly dome-shaped objects, about 1/50 inch in diameter. They are laid singly by the moth, usually on the under side of the tobacco leaves. In hot

[1] The previous edition of this bulletin was prepared by A. C. Morgan and F. S. Chamberlin.

[2] *Heliothis virescens.*

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weather from 3 to 5 days are required for hatching.

Newly hatched budworms first feed sparingly on the shells of the eggs from which they have issued and then eat from the the leaf surface small areas about the size of a pinhead. They next move toward the bud or tip of the undeveloped leaves of the plant, usually reaching it in about 24 hours. They frequently stop to feed on the leaf surface, but as this feeding seldom goes entirely through the leaf no appreciable injury is done until the bud is reached.

Upon reaching the bud the young budworms conceal themselves between the immature leaves and begin to feed ravenously. They can be detected only by opening and carefully scrutinizing the bud.

From 18 to 31 days are required for the development of the larva, or budworm, in May and June. At maturity the larva attains a length of about 1½ inches (fig. 1). Its most common color is light green, with paler stripes running lengthwise of the body; but the color may vary from green to yellowish or dark reddish brown, or it may even become very dark. When fully grown the budworm enters the soil and changes to the pupa.

The pupal or resting stage (fig. 2), which is spent about an inch beneath the surface of the soil, usually requires, in the summer months, about 12 days. The brown pupa is about ¾ inch in length.

The adult form of the budworm is a distinctively greenish-colored moth (fig. 3) with a wing spread of about 1¼ inches. The forewings are of a light green, obliquely crossed with three lighter stripes, while the hind wings are silvery and are bordered with a brownish fringe. The moth is active only at night, but in the daytime is frequently found hidden among the tobacco leaves. When disturbed it darts quickly to a new hiding place.

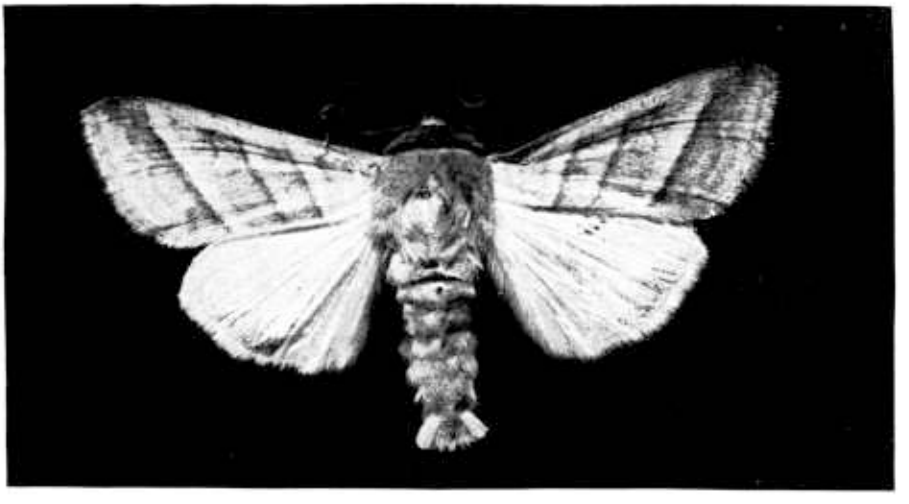

FIGURE 3.—The adult, or moth, of the tobacco budworm. Enlarged.

NATURE OF THE INJURY

Injury to the tobacco plant is caused only by the larva, or budworm. Although some damage is done by the larger larvae feeding on the mature foliage, by far the greater part of the injury is produced in the small, immature bud leaves, and begins to occur as soon as the tiny budworms, which hatch

FIGURE 4.—Top of tobacco plant injured by the budworm.

FIGURE 5.—Budworm injury to bright tobacco. Injured plant at left, uninjured plant at right.

from eggs on the outer leaves, reach the bud. Distorted leaves often result when feeding is done upon the tips of the leaves in the developing bud. When the attack is made elsewhere, large, unsightly holes develop as the leaf tissue expands (fig. 4). Both types of injury greatly lower the value of wrapper tobacco and depreciate the value of the binder and filler types. If the budworms are not controlled, they may feed upon the plants to such an extent as to cause a considerable loss in weight (fig. 5). Frequently the entire bud may be eaten away and the plant consequently stunted.

SEASONAL HISTORY

In Georgia and Florida the moths sometimes appear early enough in the spring to infest the seedbeds. Usually the young budworms begin to appear in destructive numbers about the time when tobacco plants have become established in the fields. From this time until the end of the growing season, eggs and larvae are present in tobacco fields.

The first generation of the budworm requires about 46 days for its complete life cycle, but the later generations may complete their development in a period of about 33 days.

The first two broods confine themselves almost entirely to tobacco. They overlap to a great extent, and their numbers are sufficiently large to keep tobacco fields thoroughly infested throughout their entire period of growth.

The third brood is present mainly during the latter part of July and during August. Individuals of this brood feed upon late tobacco and upon beggarweed, which becomes abundant at this season of the year.

A fourth and possibly a fifth brood are also present in the fall months. The winter is passed in the pupal stage, in the ground.

FOOD PLANTS

Tobacco and beggarweed are the preferred food plants of the tobacco budworm. The larvae also feed to a limited extent upon tomatoes, cotton, garden peas, and sweet peas, as well as on a number of other plants.

CONTROL

Dust or spray the infested buds of the plants with TDE or DDT or apply a lead arsenate-cornmeal bait. Treat as soon as the eggs or young budworms appear and repeat as necessary. On cigar tobacco weekly applications may be necessary. Two or three applications should be sufficient on flue-cured tobacco.

The Use of Dusts

Use 10 percent of DDT or TDE. While finely ground sterilized tobacco dust is preferred as a diluent, other diluents are equally effective for budworm control. Apply in such a manner that the leaves in each bud will have a thorough but even coating of the insecticide. A heavy dosage in the bud may cause bleaching of the leaves, but unless it is too heavy the plants will overcome the bleaching in about 10 days. Rotary hand-operated or traction dusters may be used when the plants are small. After the plants are about 6 weeks old, an airplane or helicopter may be used to advantage. Where the plants are small 8 pounds of the dust per acre is sufficient, but on maturing tobacco from 10 to 20 pounds should be applied.

The Use of Sprays

Concentrated sprays applied by airplane will control budworms on maturing tobacco. Use an emulsifiable concentrate containing 25 percent of either DDT or TDE at the rate of 1 to 2 quarts per acre in 2 to 5 gallons of water, depending

upon the capacity of the equipment.

The Use of Poisoned Bait

Prepare a bait by thoroughly mixing 1 pound of lead arsenate with 75 pounds of sifted corn meal (10 level tablespoonfuls per peck). Do not use more lead arsenate, as it may injure the plants. Drop a generous pinch (about ½ teaspoonful) into the bud of each plant (fig. 6). About 10 pounds per acre will be required. A worker can treat about 1½ acres in a day.

FIGURE 6.—Applying poisoned bait to tobacco for budworm control. A worker can treat about 1½ acres in a day.

The bait must be put into the bud to be effective. It may be applied to young plants by means of a quart can, fastened to a stick, with ten-penny-nail holes in the bottom. When the plants are larger and the bud leaves more tightly folded, it is necessary to apply the bait with the hands. Open the buds with one hand and make the application with the other.

Caution

TDE, DDT, and lead arsenate are poisons. Handle them with care and keep them away from irresponsible persons and from domestic animals. Do not allow them to contaminate food. After working with insecticides, wash the hands and other exposed parts of the body. If TDE or DDT spray is spilled on the skin, wash it off immediately.

GENERAL RECOMMENDATIONS

Seedbeds should be tightly covered with cloth to prevent the moths from entering and laying eggs on the plants.

The plants in seedbeds should be destroyed as soon as the beds are abandoned. If allowed to grow they serve as excellent breeding places for the budworm and contribute considerably to the abundance of moths (fig. 7).

Where tobacco is grown under shade cloth, preventive measures against budworm attack may be practiced with considerable success. In such cases the walls and top should be kept as tight as possible. Since it is necessary to provide openings in these shades through which workmen with farm animals and implements may come and go, gates covered with cloth should be provided and kept closed as much as possible to exclude moths.

At the end of the harvesting season the tobacco stalks should be cut down or otherwise destroyed. Plants left standing in the fields provide breeding places for the budworm as well as for other insect pests.

The plowing of tobacco fields in the fall or winter months undoubtedly results in the destruction of many budworm pupae in the soil, and reduces the number of moths that will emerge in the following spring. This practice is also very destructive to the tobacco hornworm, which overwinters in the soil.

FIGURE 7.—Grownup seedbed which serves as a breeding place for the tobacco budworm.

NATURAL ENEMIES

If it were not for numerous parasitic and predacious enemies of the budworm, the infestations in tobacco fields would undoubtedly be much greater. One of the important predacious enemies is a greenish spider known as *Peucetia viridans*, which is extremely common on tobacco plants in the South. The wasp *Polistes fuscatus* var. *bellicosus* destroys many of the larger larvae.

A fly called *Sarcophaga lambens*, which closely resembles the house fly, acts as a parasitic enemy of the budworm. It deposits on the body of the budworm tiny maggots which burrow into their host and, after feeding for sometime, finally destroy it.

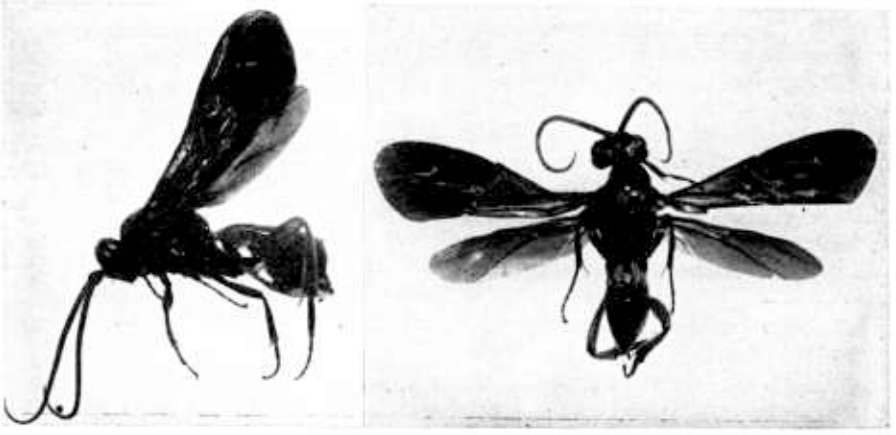

FIGURE 8.—*Cardiochiles nigriceps*, an important parasite of the tobacco budworm.

The most important natural enemy of the tobacco budworm is a black-winged, red-bodied wasplike insect (*Cardiochiles nigriceps*) (fig. 8), which is often seen hovering around the tobacco plants. Upon finding a small budworm, this insect quickly inserts an egg in its body. The parasite which hatches from the egg feeds within the body of the budworm and ultimately destroys it. The mistaken impression has existed in some areas that the adult parasite found flying around tobacco buds is the parent of the budworm.

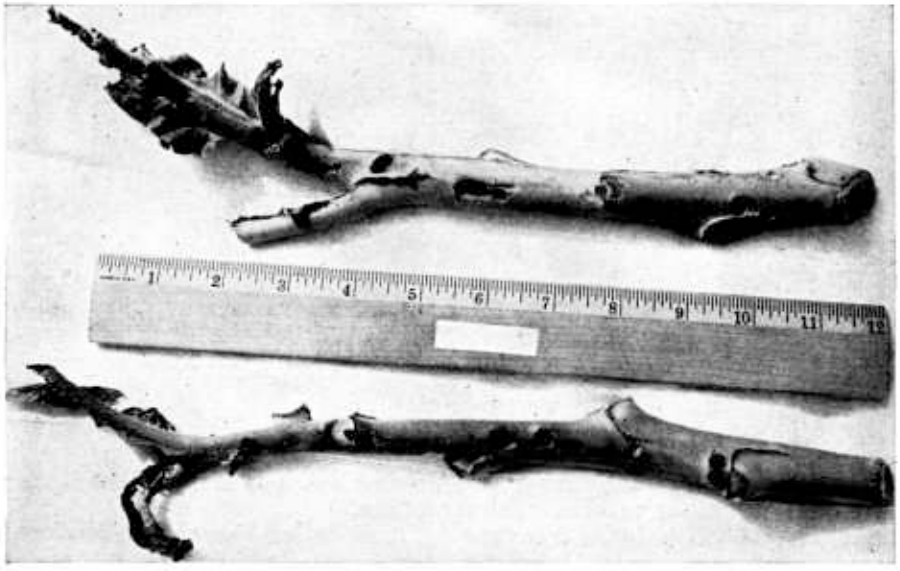

FIGURE 9.—Tobacco plants with the leaves removed to show holes made by the corn earworm.

CORN EARWORM CONFUSED WITH BUDWORM

The corn earworm [3] which closely resembles the tobacco budworm and is sometimes called the false budworm, frequently infests tobacco plants. Although this pest seldom injures shade tobacco, it appears on maturing flue-cured tobacco each year and may cause widespread damage to the crop. As a rule such damage occurs during the latter part of the season after the plants have been topped. At this time both insects may be present on the same plants. Damage is most likely to occur where growers allow hairy vetch to mature near tobacco fields. Corn earworms may develop in large numbers on the vetch and then move onto nearby tobacco.

When they attack small plants, the larvae destroy the buds. When they attack large plants, they not only destroy the buds but eat the leaves and bore into the stalks (fig. 9). Stalk-boring causes more damage than feeding on the leaves.

The corn earworm is controlled with TDE or DDT dusts or sprays applied as for budworms.

[3] *Heliothis armigera.*

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